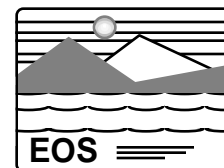




EOS AM-1 Mission Operations Review

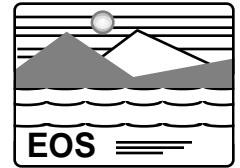


FOT TRAINING AND MISSION SIMULATIONS

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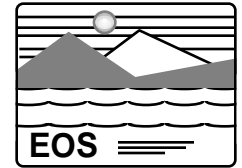
Topics



- **FOT Training Approach**
- **FOT Certification Approach**
- **Ground and Space Segment Training**
- **Spacecraft Tests**
- **Mission Simulations**



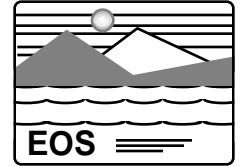
FOT Training Approach



- **FOT training coordinator responsible for ensuring FOT training**
- **FOT training plan and approach**
 - **Classroom instruction**
 - » **Introductory**
 - » **Functional**
 - » **Operational**
 - **On-the-job training**
 - **Self study**
 - **Simulation**
 - **Satellite**
 - **Ground**
 - **Cross training**



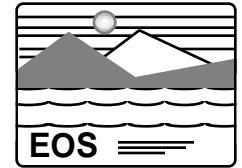
FOT Certification Approach



- **FOT certification plan and approach**
 - **Identify certifiable positions**
 - » **Operations controller/shift supervisor**
 - » **Spacecraft activity controller**
 - » **Online engineer**
 - **Identify formal and informal training required**
 - **Describe roles and responsibilities for**
 - » **Administering certifications for written exam, performance exam, and instructor observation**
 - » **Approving certifications**



Ground Segment Training

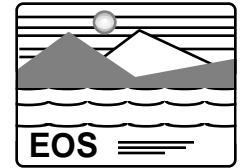


- Will include training on
 - FOS/IST*
 - Digital Voice Distribution System*
 - FDD workstation (all applications)
 - NCC (current, 98 version)
 - TDRSS
 - EDOS
 - Local Site Manager
 - ETS MPS/LRS
 - Flight software tools

***IOTs should attend**



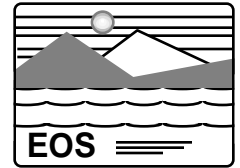
AM-1 Space Segment Training



- **Will include training on**
 - **AM-1**
 - » **Spacecraft bus**
 - » **Instruments**
 - **Spacecraft Simulator**
 - **Spacecraft Analysis System**



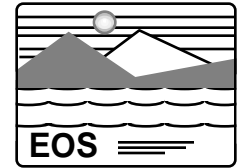
Spacecraft Tests



- **FOT/IOT will receive hands-on experience during the following tests:**
 - **Bus Comprehensive Performance Tests**
 - **EOC Compatibility Tests**
 - **Comprehensive Performance Tests**
 - **TDRS RF Compatibility Tests**
 - **Thermal Vacuum Test**
 - **End-to-End Tests**
 - **100-Hour Test**
 - **Launch Site Readiness Test**
 - **Launch Pad Communications Test**



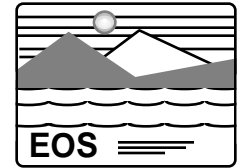
ECT1 Test



- **ECT1 is first major test milestone for FOT**
- **FOT's preparation and test schedule for ECT1**
 - **December 1996 – Test command (EOC->EDOS->SCS)**
 - **December 1996 – Validate all PDB commands against SCS (EOC->EDOS->SCS)**
 - **January 1997 (week 1) – Conduct ECT1 dry run with ETS (EOC->ETS)**
 - **January 1997 (week 2) – Conduct ECT1 dry run with SCS (EOC->EDOS->SCS)**
 - **January 1997 (week 3) – Conduct ECT1; first time FOT commands AM-1 (EOC->EDOS->SCS->AM-1)**



Mission Simulations

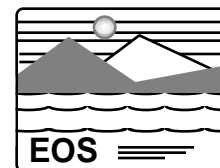


- Simulations executed by FOT follow EOS simulations plan
- Categories of simulations
 - ETS: FOS software execution with ETS as an input source
 - » Command, telemetry, ECL procedures, and display pages
 - SSIM: FOS software execution with SSIM as input source
 - » Command, telemetry, ECL procedures, and display pages
 - » Loads, dumps, AM-1 SCC/CTIU functionality
- Simulation goal is to support
 - Launch configuration preparation and rehearsal*
 - Appendage deployment
 - Orbit acquisition
- Simulation goal is to support (cont'd)
 - Schedule creation and load generation*
 - Normal real-time operations*
 - SSR management
 - FOS-IST interactions *
 - Contingencies (bus, instruments)*

*IOT participation required

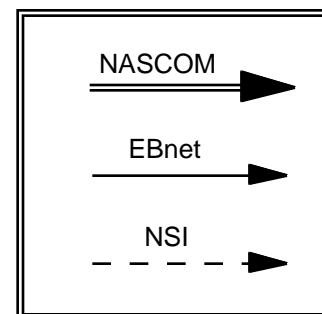
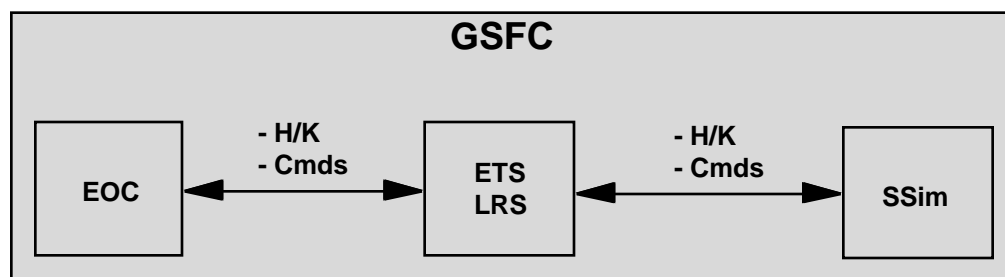
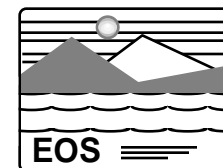


FOT Training Simulations



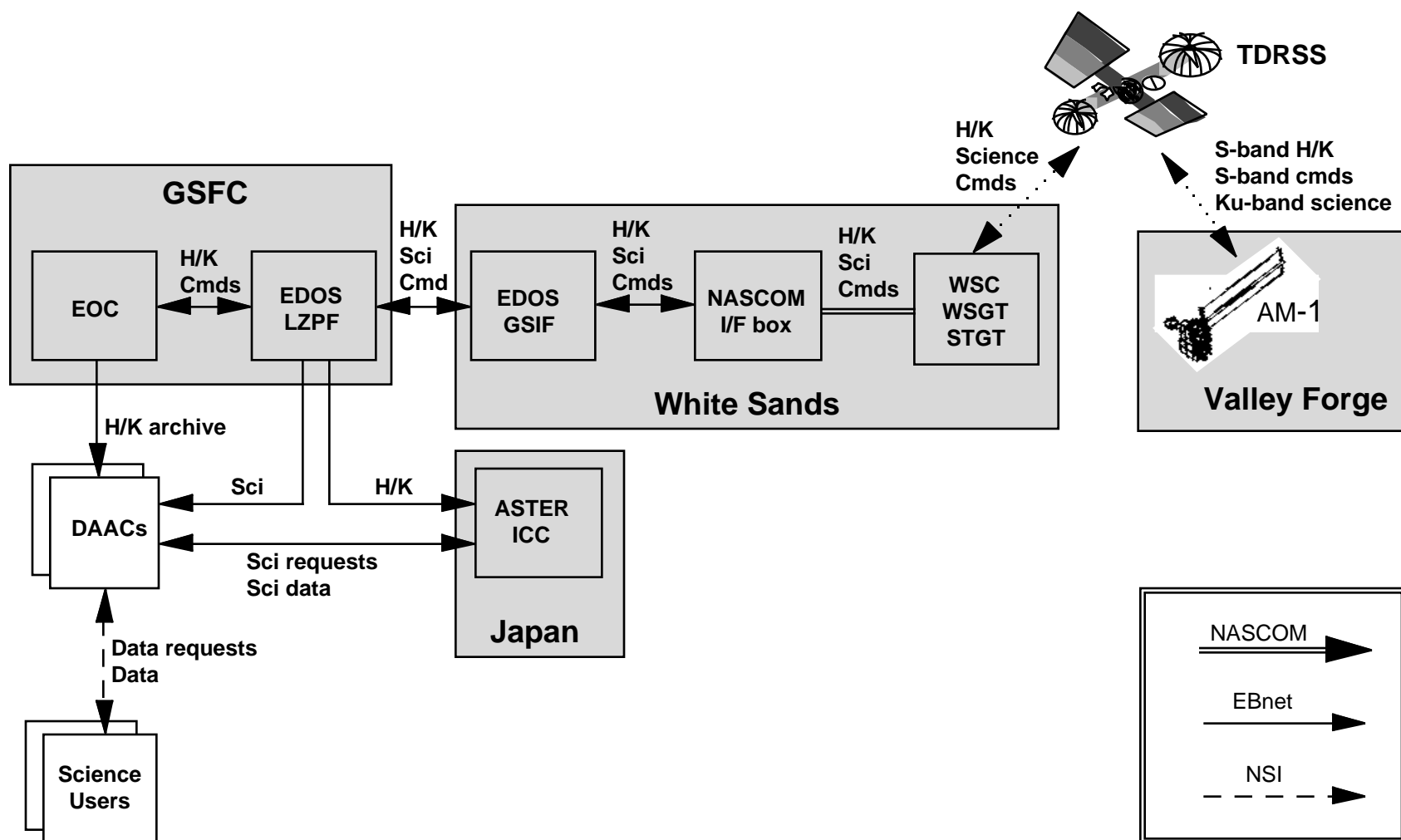
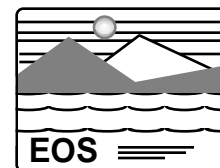


Configuration for Typical Internal EOC Spacecraft Simulation



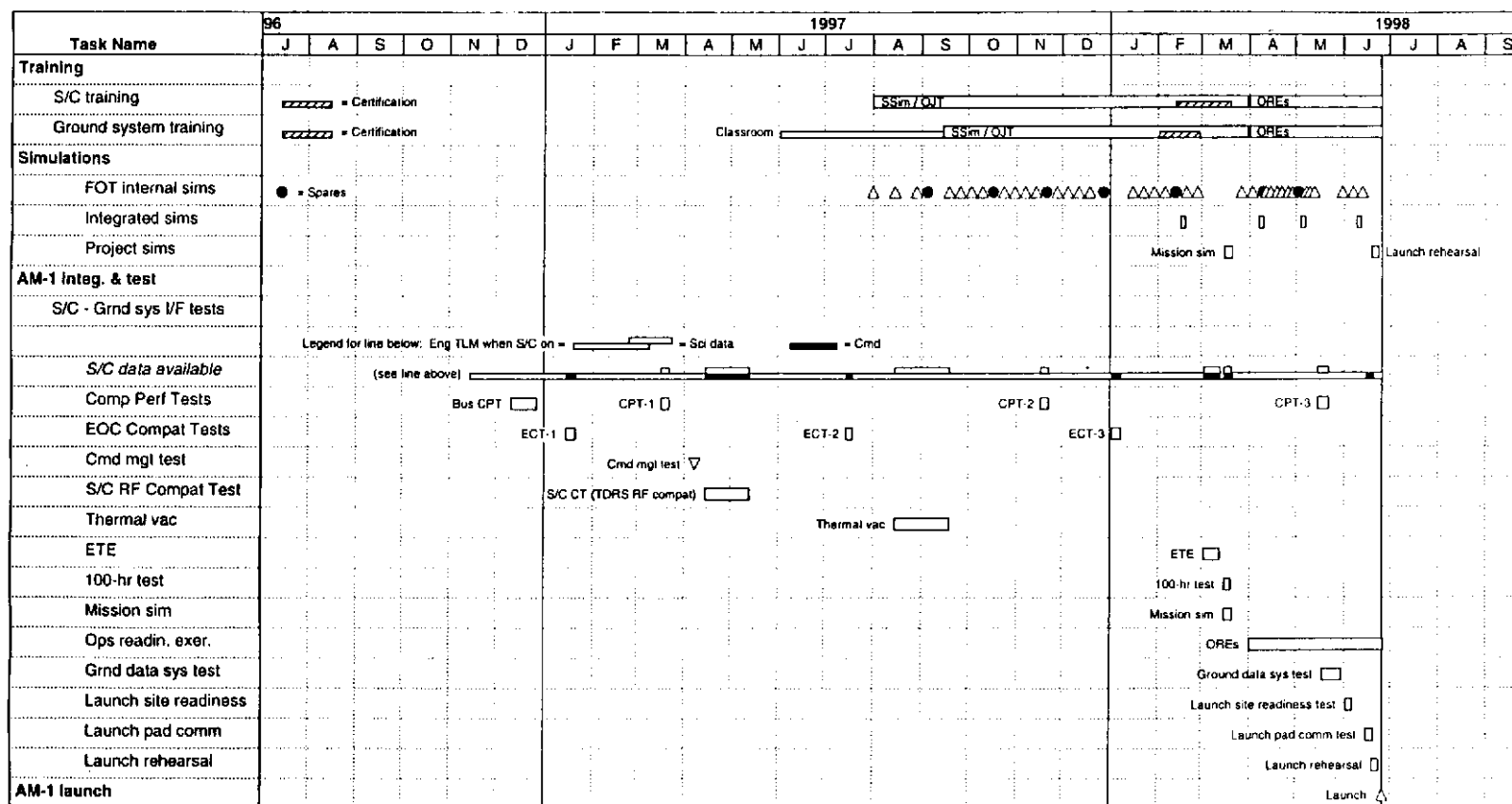
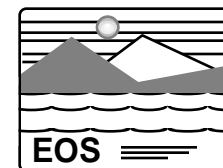


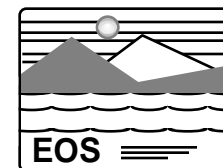
Mission Simulation Using AM-1





AM-1 Training and Simulation Schedule





Activity Simulated	Sho No.	Date	Simulation Type	Length	Particip ¹	Simulators Req'd ²	Comments
Nominal on-orbit	1	8/1	Internal	8 hrs	10	-	Simulation & procedure familiarization
Repeat Sim #1	2	8/15	Internal	8 hrs		-	FOT shifts #3, #4
Sim minor anom. if desired	3	8/29	Internal	8 hrs	10	-	Continue familiariz., verify & uplink ephemeris & table loads
Repeat or add new sim	4	9/5	Spare	8 hrs		-	Skip if unneeded
On-orbit, one anom.	5	9/19	Internal	8 hrs	10	-	Begin anom familiariz.
Repeat Sim #5	6	9/26	Internal	8 hrs		-	FOT shifts #3, #4
Sim TDRS contacts	7	10/3	Internal	8 hrs	10	-	Begin TDRS familiariz
Repeat Sim #7	8	10/10	Internal	8 hrs		-	FOT shifts #3, #4
Repeat or add new sim	9	10/17	Spare	8 hrs		-	Skip if unneeded
Sim SSR dumps	10	10/24	Internal	8 hrs	10	-	Begin SSR familiariz.
Repeat Sim #10	11	10/31	Internal	8 hrs		-	FOT shifts #3, #4
Inst. checkout	12	11/7	Internal	24 hrs	4, 10	-	Low-rate sci inst data
Repeat Sim #12	13	11/14	Internal	24 hrs	4	-	FOT shifts #3, #4
Repeat or add new sim	14	11/21	Spare	8 hrs		-	Skip if unneeded
TDRS srves, no anom	15	11/28	Internal	12 hrs	2, 3, 5, 6, 9, 10	MPS, RF SOC	D/F w/ TGT personnel
Launch support	16	12/5	Internal	8 hrs	2, 4, 8, 10	-	Launch familiariz.
Repeat Sim #16	17	12/12	Internal	8 hrs	2, 4, 8, 10	-	FOT shifts #3, #4
TDRS srves, no anom	18	12/19	Internal	12 hrs	2, 3, 5, 6, 9, 10	MPS, RF SOC	D/F w/ TGT personnel
Repeat or add new sim	19	12/28	Spare	8 hrs		-	Skip if unneeded
Act., orbit adjust	20	1/16	Internal	8 hrs	10	-	Act/orbit adj familiariz
Repeat Sim #20	21	1/23	Internal	8 hrs	10	-	FOT shifts #3, #4
Sci data, w/ anom	22	1/30	Internal	12 hrs	2, 6, 10	HRS	Hi-rate sci data
Repeat Sim #22	23	2/6	Internal	12 hrs	2, 6	-	FOT shifts #3, #4
Repeat or add new sim	24	2/13	Spare	8 hrs		-	Skip if unneeded
Launch, act., orb. adj.	25	2/16	Integrated	72 hrs	2, 4, 6, 10	HRS	All gnd sys, w/ anom.
Practice Mission Sim	26	2/20	Internal	48 hrs	2, 4, 6, 9, 10	HRS	Step thru Mission Sim
Practice Mission Sim	27	2/27	Internal	72 hrs	2-6, 9, 10	HRS, MPS, RF SOC	As above, w/ TDRS for 8 hrs
Mission Simulation	28	3/16	Integrated	5 days	2, 4-6, 9, 10	HRS, MPS, RF SOC	1st 3 days, w/ TDRS for 8 hrs, no anom., thermal vac
Array & HGA deploy	29	3/27	Internal	8 hrs	10	-	w/ anomalies
Repeat Sim #29	30	4/3	Internal	8 hrs		-	FOT shifts #3, #4
Inst. act. & checkout	31	4/7	Integrated	72 hrs	2, 4-6, 10	HRS	FOTs check instruments
Repeat or add new sim	32	4/10	Spare	8 hrs		-	Skip if unneeded
Uplink new PSW load	33	4/12	Internal	8 hrs	10	-	Practice backing out
Implement new PDB	34	4/15	Internal	8 hrs		-	Practice backing out
Inst resource conflicts	35	4/19	Internal	8 hrs	10	-	P&S resolve conflicts
Repeat Sim #35	36	4/22	Internal	8 hrs		-	FOT shifts #3, #4
Instrument TOO	37	4/26	Internal	8 hrs	10	-	P&S late requests
Repeat Sim #37	38	4/29	Internal	8 hrs		-	FOT shifts #3, #4
Repeat or add new sim	39	5/3	Spare	8 hrs		-	Skip if unneeded
Sci dumps, L0 to DAACs	40	5/4	Integrated	72 hrs	2, 4, 6, 8-11	HRS	Sci users & ASTER retrieve data from DAACs
Contingency S-band	41	5/8	Internal	8 hrs	2, 6, 7, 9, 10	Site data	T&C via ON/WOTS ground site
Repeat Sim #41	42	5/10	Internal	8 hrs	2, 6, 7, 9	Site data	FOT shifts #3, #4
Contingency X-band	43	5/13	Internal	8 hrs	2, 6, 7, 9, 10	Site data	T&C & X-band
Repeat Sim #43	44	5/31	Internal	8 hrs	2, 6, 7, 9	Site data	FOT shifts #3, #4
Define as needed	45	6/7	Internal	8 hrs		-	Use as needed
Launch thru inst. checkout	46	6/9	Integrated	72 hrs	2, 4, 8-10	HRS	Practice launch rehears.
Define as needed	47	6/13	Internal	8 hrs		-	Use as needed
Launch rehearsal	48	6/19	Integrated	4 days	2, 4-6, 9, 10		Pre-launch config thru activ.

¹Participants column is FOT for all sims, plus: 2=EBnet, 3=RF SOC, 4=IOTs, 5=TGT, 6=EDOS/GSIF, 7=Ground site, 8=ASTER ICC & JPL Gateway, 9=NCC, 10=FDD, 11=DAAC(s)

²Simulators Req'd. column is SSIM and ETS LRS for all sims, plus: ETS MPS, ETS HRS, or RF SOC as indicated